

We Claim:

1. A method of making a sand mold, comprising:
  - a) placing a sand mold mixture containing moisture into a pattern;
  - b) restraining the sand mold mixture in the pattern; and
  - c) exposing the sand mold mixture to a vacuum, the vacuum being low enough to flash off the moisture in the sand mold mixture thereby drying the sand mold mixture to create a sand mold, the restrained sand mold mixture preventing voids in the sand mold.
2. The method of claim 1, the vacuum being less than 100 Torr.
3. The method of claim 2, the vacuum being preferably 4 to 5 Torr.
4. The method of claim 1, the sand mold mixture being exposed to the vacuum for less than 30 minutes.
5. The method of claim 1, further comprising heating the sand mold mixture before placing the sand mold mixture into the pattern.
6. The method of claim 5, the sand mold mixture being at least 140° F when placed into the vacuum chamber.
7. The method of claim 1, the sand mold mixture containing approximately 1.5 to 2.0% moisture when placed into the pattern.
8. A method of making a sand mold, comprising:
  - a) placing a sand mold mixture containing moisture into a pattern;
  - b) placing a restraining member onto the pattern, the restraining member restraining the sand mold mixture within the pattern; and
  - c) exposing the restrained sand mold mixture filled pattern to a vacuum, the vacuum being low enough to flash off the moisture in the sand mold mixture thereby drying the sand mold mixture to create a sand mold, the restraining member preventing voids in the sand mold.
9. The method of claim 8, further comprising heating binder coated sand and mixing the binder coated sand with water to create the sand mold mixture.

10. The method of claim 8, the binder coated sand being heated to approximately 180 to 200° F.
11. The method of claim 8, the sand mold mixture being at least 140° F when placed into the pattern.
12. The method of claim 8, further comprising heating water to approximately 150° F before mixing the water with the binder coated sand.
13. The method of claim 8, the vacuum being less than 100 Torr.
14. The method of claim 13, the vacuum being preferably 4 to 5 Torr.
15. The method of claim 8, the sand mold mixture being exposed to the vacuum for less than 30 minutes.
16. The method of claim 8, the restraining member including apertures having a hydraulic radius of 0.5 or less.
17. The method of claim 8, the sand mold mixture containing approximately 1.5 to 2.0% water when placed into the pattern.
18. A method of making a sand mold, comprising:
  - a) placing a sand mold mixture containing moisture into a pattern;
  - b) restraining the sand mold mixture in the pattern by placing a perforated lid on the pattern, the perforated lid having apertures with a hydraulic radius of 0.5 or less; and
  - c) exposing the pattern containing the sand mold mixture to a vacuum, the vacuum being low enough to flash off the moisture in the sand mold mixture thereby drying the sand mold mixture to create a sand mold, the restraining member preventing voids in the sand mold.
19. The method of claim 18, further comprising heating the sand mold mixture before placing the sand mold mixture into the pattern.
20. The method of claim 18, the vacuum being less than 100 Torr.
21. The method of claim 20, the sand mold mixture being exposed to the vacuum for 30 minutes or less.

22. The method of claim 18, the sand mold mixture containing approximately 1.5 to 2.0% moisture when placed into the pattern.